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1. A polarized display device having an expanded angle of illumination for optimizing a viewing angle in a desired plane comprising:

a direct view polarized display panel; and

a transmissive polarization rotating element proximate to a surface of the polarized display panel, wherein said polarization rotating element rotates light polarization between a first linear polarization orientation and a second linear polarization orientation.

2. The polarized display device of claim 1 wherein said first linear polarization orientation comprises an incoming orientation and said second linear polarization orientation comprises an outgoing orientation.

3. The polarized display device of claim 2 wherein said incoming orientation comprises a rear element pass axis and said outgoing orientation comprises a rear polarizer pass axis.

4. The polarized display device of claim 1 wherein said transmissive polarization rotating element is index matched to the direct view polarized display panel.

5. The polarized display device of claim 1 wherein the first linear polarization orientation is aligned with a major axis of a desired viewing envelope.

6. The polarized display device of claim 1 wherein said transmissive polarization rotating element is located in front of the direct view polarized display panel.

Fig 3

7. The polarized display device of claim 1 wherein said transmissive polarization rotating element is located to a rear of the direct view polarized display panel.

8. The polarized display device of claim 1 further comprising an optical element adjacent to a first side of said transmissive polarization rotating element and the direct view polarized display panel adjacent to a second side of said polarization rotating element.

9. The polarized display device of claim 8 wherein the optical element has polarization-sensitive asymmetric transmittance characteristics related to Brewster angle effects.

10. The polarized display device of claim 8 wherein the optical element has a polarization axis.

11. The polarized display device of claim 10 wherein the optical element comprises a polarization sensitive scattering element.

12. The polarized display device of claim 1 wherein the transmissive polarization rotating element comprises a member from the group consisting of a retarder, a halfwave retarder, a multilayer retarder and a twisted optical axis element.

13. The polarized display device of claim 1 wherein the viewing angle comprises an angle of more than 20 degrees off of normal.

14. The polarized display device of claim 1 further comprising front and rear polarizing filters and wherein the direct view polarized display panel comprises a polarization modular situated between front and rear polarizing filters, and wherein said

transmissive polarization rotating element is situated external to a region between said front and rear polarizing filters.

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15. The polarized display device of claim 1 wherein the direct view polarized display panel is an active matrix liquid crystal display.

16. The polarized display device of claim 8 wherein the optical element is an optical film.

17. An apparatus for improving the viewability characteristics of a polarized display panel comprising:

a polarization sensitive scattering element having a first linear polarization axis; and

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a transmissive polarization rotating element attached to one surface of the polarization sensitive scattering element, wherein said polarization sensitive scattering element rotates light polarization between a first linear polarization orientation and a second linear polarization orientation.

18. The invention of claim 17 wherein said transmissive polarization rotating element is proximate to the polarized display panel, and a polarization axis of said polarization sensitive scattering element is oriented such that a major axis of a transmittance envelope associated with said polarization sensitive scattering element is oriented along a desired viewing angle.

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19. A method of projecting light using a polarized display, the method comprising the steps of:

transmitting light from a rear optical element in an asymmetric angular pattern for a first polarization and having a transmittance envelope with a major axis for the first linear polarization;

receiving light by a transmissive polarization rotating element from said rear optical element in the first linear polarization;

rotating light to a second linear polarization by the transmissive polarization rotating element; and

receiving light from the transmissive polarization rotating element in the second linear polarization by a polarized display panel having a rear polarizer.

20. The method of claim 19 further comprising the step of selecting a range of angles to be optimized.

21. The method of claim of claim 20 wherein the step of selecting a range of angles comprises selecting a material for the transmissive polarization rotating element that corresponds with the selected angle.

22. The method of claim 21 wherein the step of selecting a material comprises selecting a material with predetermined retardances and angles.

23. A polarized display device comprising:

a rear optical element transmitting light in a pattern and having a first linear polarization;

a direct view polarized display panel having a rear polarizer oriented to receive light from the rear optical element in the first linear polarization and transmit light in a second linear polarization; and

a transmissive polarization rotating element receiving light from the polarized display panel in the second linear polarization, rotating the light to a third linear polarization, and transmitting the light.

24. The polarized display device of claim 23 wherein the pattern of light transmitted by the rear optical element has a major axis and a minor axis, the major axis being aligned with the pass axis of the polarized display panel and being significantly broader than the minor axis.